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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Hans Biermaier  
Serial No.: 09/831,585  
Filed: July 27, 2001  
Confirmation No.: 7039  
For: DEVICE FOR THERMAL STERILIZATION OF LIQUIDS  
Examiner: Monzer R. Chorbaji

Art Unit: 1744

October 19, 2005

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APPEAL BRIEF

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APPEAL BRIEF

This is an appeal from the final rejection of the claims of the above-identified application made in the final Office action dated August 5, 2005. This Appeal Brief is being filed simultaneously with a Notice of Appeal.

I. REAL PARTY IN INTEREST

The real party in interest in connection with the present appeal is the inventor, Hans Biermaier of Derching, Germany, owner of 100 percent interest in the pending application.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any pending appeals or interferences which may be related to, directly affect or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 11 and 13-30 are currently pending in the application. A copy of the pending claims appears in the Claims Appendix of this Brief.

Claims 11, 13-14, 20-23, and 29-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No.

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6,623,603 (Call) in view of U.S. Patent No. 6,402,897 (Gunn) and further in view of U.S. Patent No. 4,411,310 (Perry).

Claims 15-16 and 24-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Call in view of Gunn and Perry as applied to claims 11 and 22 and further in view of U.S. Patent No. 5,251,689 (Hakim-Elahi).

Claims 17-19 and 26-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Call in view of Gunn and Perry as applied to claims 11 and 22 and further in view of U.S. Patent No. 5,687,678 (Suchomel).

The rejections of claims 11 and 13-30 under 35 U.S.C. §103(a) are being appealed.

#### IV. STATUS OF AMENDMENTS

No amendments have been filed after the final rejection.

#### V. SUMMARY OF CLAIMED SUBJECT MATTER

The following summary correlates claim elements to specific embodiments described in the application specification, but does not in any manner limit claim interpretation. Rather, the following summary is provided only to facilitate the Board's understanding of the subject matter of this appeal.

In one aspect, the present invention is directed to a device 1 for thermal sterilization of liquids. See page 6, lines 29-30 and Figs. 1a and 1b. The device 1 generally comprises a counterflow heat exchanger including a conduit 3 with a heating section 4 and a cooling section 5 in fluid connection with one another. See page 7, lines 20-30 and Figs. 1a and 1b. The device 1 also comprises a heating source 13 for heating the liquid. See page 7, lines 8-14 and Figs. 1a and 1b. The heating section 4 and the cooling section 5

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are spirally arranged around the heating source 13. See page 7 lines 20-28 and Figs. 1a and 1b. The heating source 13 is generally located in the center of the spiral. See page 7, lines 8-9 and Figs. 1a and 1b. The conduit 3 is constructed of flexible material. See page 9, lines 11-14 and Figs. 1a-4b. Individual windings of conduit 3 lay one on the other and contact each other. See page 7, line 20 through page 8, line 4 and Figs. 1a-4b. A check valve 7 allows liquid flow only in a direction from the heating section 4 to the cooling section 5. See page 7, lines 1-4 and Figs. 1a and 1b.

In another aspect, the present invention is directed to a thermal sterilizer for liquids comprising a counterflow heat exchanger including a conduit 3 with a heating section 4 and a cooling section 5 in fluid connection with one another. See page 7, lines 20-30 and Figs. 1a and 1b. The sterilizer also comprises a heating source 13 for heating the liquid. See page 7, lines 8-14 and Figs. 1a and 1b. The heating section 4 and the cooling section 5 are spirally arranged around the heating source 13. See page 7 lines 20-28 and Figs. 1a and 1b. The conduit 3 is constructed of flexible material. See page 9, lines 11-14 and Figs. 1a-4b.

#### VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Appellant appeals the rejection of claims 11, 13-14, 20-23, and 29-30 under 35 U.S.C. §103(a) as being unpatentable over Call in view of Gunn and further in view of Perry.

B. Appellant appeals the rejection of claims 15-16 and 24-25 under 35 U.S.C. §103(a) as being unpatentable over Call in view of Gunn and Perry and further in view of Hakim-Elah.

C. Appellant appeals the rejection of claims 17-19 and 26-28 under 35 U.S.C. §103(a) as being unpatentable over Call in view of Gunn and Perry and further in view of Suchomel.

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VII. ARGUMENT

A. Claims 11, 13-14, 20-23, and 29-30 are non-obvious and patentable over Call in view of Gunn and further in view of Perry.

1. Claim 11

Claim 11 recites a device for thermal sterilization of liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,  
the heating section and the cooling section being spirally arranged around the heating source,

the heating source being generally located in the center of the spiral,

said conduit being constructed of flexible material,  
individual windings of conduit lying one on the other and contacting each other, and

a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

Claim 11 stands rejected under 35 U.S.C. §103(a) as unpatentable over Call in view of Gunn and further in view of Perry. As explained below, Call was not properly applied in the rejection because only portions of the Call patent are prior art to the present invention. As properly applied, most of the features of the invention are not shown by Call, so that the reference is no longer relevant. As also explained below, there is no suggestion or motivation to combine Call with Gunn and with Perry as asserted by the Examiner.

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Importantly, portions of the Call patent are not prior art under 35 U.S.C. §102(e) because they are not supported by the provisional application upon which Call is based. The Call non-provisional application was filed after the international filing date (the effective filing date under 35 U.S.C. §365(c)) of the present application. Under MPEP §2136.03, the filing date of the Call provisional application can only be used if the provisional properly supports the subject matter relied upon to make the rejection. Portions of the Call patent that are not supported by the provisional are not prior art to the present invention because the Call non-provisional application was filed after the international filing date of the present application. The Call non-provisional application was filed October 19, 1999, while the international filing date of the present application is September 14, 1999.

The Call provisional application differs from the Call patent in many respects. In particular, the Call provisional application does not show the embodiments of Figs. 11-16 of the Call patent. Also, Figs. 6-7 of the provisional are not included in the Call patent.

The present application differs from the Call provisional application in that the following features are not shown:

- 1) the heating section and the cooling section spirally arranged around the heating source,
- 2) the heating source generally located in the center of the spiral,
- 3) the conduit constructed of flexible material,
- 4) individual windings of conduit lying one on the other and contacting each other, and



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5) a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

Thus, the majority of the features recited in claim 1 are not shown by Call, as properly applied under §102(e). Accordingly, Call is not relevant to the claimed invention.

Even assuming that Call is relevant, there is no suggestion or motivation to combine it with various features of Gunn and Perry as asserted in the rejection. In order to maintain a §103 rejection, the Examiner must present a convincing line of reasoning why an ordinarily skilled artisan would have found the claimed invention to have been obvious. *Ex parte Clapp*, 227 U.S.P.Q. 972 (BPAI 1985). No such reasoning has been presented in this case.

In an embodiment of the present invention, the liquid (water) is heated to very high temperatures up to 150°C by the heating device. The high temperatures will cause superheated steam to be produced in the center of the spiral arrangement, thereby dramatically increasing the pressure. When the high pressure is greater than the water pressure from the supply, the high pressure will act as a pump to cause a backflow. Therefore, the claimed device includes an additional element for preventing a backflow against the supply. Claim 11 requires a check valve for preventing this backflow.

In addition, the gas pressure of the superheated steam is not constant but is varying within a large range. Because of this variance, pressure waves are produced. If one uses only a pump as taught by Call, these pressure waves can reach the outlet of the pump, and can even destroy the pump. The check valve of the present invention blocks the pressure waves and inhibits them from reaching the outlet.

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Gunn discloses a distillation unit performing the functions of a distillation unit and a water heater (column 3, line 53). Impure feed water from feed pipe 9 flows through a first heat exchanger (called "distilled water cooler 35"), then via feed pipe 9 through a "concentrate heat exchanger 23", then via line 9d through another heat exchanger 9e, and finally into a distillation unit 5. Within this distillation unit the feed water is separated into two components, 1) distilled steam and 2) concentrate.

The Gunn device comprises three different heat exchangers, namely:

- 1) A cold distilled water cooler 35 which preheats the feed water from line 9a for cold water preparation.
- 2) A concentrate heat exchanger where the feed water from line 9 is further preheated by concentrate from the distillation unit.
- 3) The coiled section 9e immersed into the water of the tank 3 wherein the preheated feed water from the concentrate heat exchanger 23 is thermally coupled with the distilled water within tank 3.

However, the purpose of these three heat exchangers is not to purify the water. The gist of the Gunn device is the distillation unit 5, wherein the feed water is separated into distilled steam and concentrate. Gunn has at least one inlet (9a) for feed water and at least two outlets: one outlet for distilled water (21 and/or 31) and another outlet for concentrate (13c).

In contrast, the present invention does not use a distillation unit. The device of the invention has only one inlet and only one outlet and is designed to provide relatively cold water. The invention does not separate the feed water into two components. All feed water is drawn out:

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from the device via a single exit. The invention does not use a distillation process but only heats the feed water to a high temperature where all bacteria, viruses, etc. are destroyed. The heating is done in the middle of the heat exchanger. The steam or hot water from the middle of the heat exchanger is used to preheat the incoming feed water.

With reference to page 7 of the final Office action, the Examiner compares the distilled water of Gunn with the sterilized water of the invention. However, distillation is a completely different process in comparison to the present invention. Again, distillation as taught by Gunn separates water into two components (i.e., distilled water and concentrate) which need distinct tubes and flow paths. While, the distilled water appears to be sterilized, the concentrate is clearly impure. On the other hand, the present invention does not separate the water into two components. Rather, the present invention sterilizes all the feed water without producing any concentrate.

The feed water of the present invention is preheated in the heating section of the counter-flow heat exchanger. Then it is heated by a heating source to very high temperatures which will cause super-heated steam to be produced in the center of the spiral arrangement, thereby dramatically increasing the pressure. When the high pressure is greater than the water pressure from the feed supply, the high pressure will act as a pump. The check valve is advantageous because it prevents a back flow against the supply. As gas bubbles are produced one after the other, there is some oscillation of the pressure, and pressure waves are thereby created. During the time period where the check valve is closed, no additional feed water is charged into the unit, and only hot water is discharged through the second part of the

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heat exchanger (the cooling section). Therefore, the check valve of the present invention not only prevents a back flow, but also has serves another purpose: to form a kind of pump in connection with gas bubbles produced by the heating section. In addition, the check valve provides for a stable pressure within the heating section, if it is in its closed position.

The check valves 29, 132, 232 (col. 6 , lines 40-43; col. 12, lines 5-9, col. 15, lines 20-24) of Gunn are only for controlling the flow of concentrate out of the distillation unit and to prevent backflow of concentrate. If any gas bubbles of overheated water occur, then they are present inside the distillation unit 5. On the other hand, Gunn states that the concentrate leaving the distillation unit will be approximately at the distillation temperature of 155°F (86.11°C), which is below the steam temperature. It also should be noted that the check valve 29 is connected into tube 13 after the concentration unit 5. Even if gas bubbles occur within the distillation unit 5, they clearly may run through the concentration check valve 29. In the flow after the concentrate check valve 29, i.e., in tube 13b of Fig. 1, no gas bubbles will occur and therefore, the goal of the check valve 29 of Gunn is different from the check valve of the present invention.

In contrast, the check valve of the invention has the further purposes of:

- 1) blocking pressure waves of gas bubbles of superheated steam from escaping through the inlet of the device, and
- 2) in combination with the flexible conduit, aiding the below-mentioned "peristaltic motion", which drives the water flow in the desired direction.

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It should be clear that the check valve of the present invention has a different purpose and a different function and therefore, it is improper to substitute the check valve of Gunn for the check valve of the claimed invention. Also, neither Call nor Gunn suggest addition of a check valve to the device of Call. Moreover, neither reference suggests such an addition for the above purposes, which provide an advantage in combination with the other claimed elements of the invention.

Claim 11 is further patentable over the references because it recites that the conduit is constructed of flexible material. Call and Gunn do not show or suggest a conduit constructed of flexible material. The Examiner asserts that Perry shows flexible material. However, the Examiner fails to show some motivation or suggestion for the purported combination.

Perry shows a heat exchange apparatus made up of a plurality of thin flexible sheets bonded to one another. The main purpose of this device is to reduce the costs of the entire system in comparison with metal as material for the heat exchange elements (column 2, lines 21-25).

In contrast, the flexible material of the heat exchanger of the claimed invention is used to allow "peristaltic motion" caused by the pressure waves mentioned above. The "peristaltic motion" promotes additional transport of the water, in combination with the check valve at the inlet, producing a pulsing water flow through the heat exchanger with phases of higher and lower flow velocity. Because of this "pump effect" of the conduit, the device operates even with very minimal water pressure at the heat exchanger inlet (comp. page 5, first paragraph of the English translation of the application). Therefore, the flexible material of the present invention supports the pump function of the gas bubbles and

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the check valve for discharging purified water from the cooling section. As should be clear, the flexible material of the present invention is used for a different purpose than Perry.

Regarding combining elements found in the prior art, the Federal Circuit has stated: "Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant." *In re Kotzab*, 217 F. 3d. 1365, 1369-1370 (Fed. Cir. 2000). *Emphasis added.* "Further, a rejection cannot be predicated on the mere identification...of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." *Id.* at 1371. *Emphasis added.*

As can be seen, the synergistic combination of features of claim 11, including the flexible conduit, the spiral arrangement and the check valve, work together in a new device that is a significant improvement over the prior art. The claimed device is desirably compact, easy to operate, and operates with relatively little power. This synergistic combination of features is clearly not shown or suggested by

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Call, Gunn, Perry or the other art of record. Accordingly, claim 11 is allowable.

Claims 13-21 depend directly or indirectly from claim 11 and are submitted as patentable for the same reasons.

**2. Claim 22**

Claim 22 is directed to a thermal sterilizer for liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,  
the heating section and the cooling section being spirally arranged around the heating source,  
said conduit being constructed of flexible material.

To the extent claim 22 recites the same subject matter as claim 11, it is submitted as patentable for the same reasons. Claims 23-30 depend directly or indirectly from claim 22 and are submitted as patentable for the same reasons.

**B. Claims 15-16 and 24-25 are non-obvious and patentable over Call in view of Gunn and Perry and further in view of Hakim-Elahi.**

Claims 15-16 and 24-25 and recite that the conduit comprises elastic films. The rejection combines portions of Call, Gunn, Perry and a fourth reference, Hakim-Elahi, which "teaches the use of elastic materials in the art of designing heat exchangers." Applicants agree that elastic materials have been used before in heat exchangers. However, the rejection again fails to state a convincing line of reasoning why one of ordinary skill would have pieced together the

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disparate elements of four references. It is clear the Examiner is using hindsight to piece the claimed invention together from the four references. Accordingly, claims 15-16 and 24-25 are submitted as patentable for this additional reason.

C. Claims 17-19 and 26-28 are non-obvious and patentable over Call in view of Gunn and Perry and further in view of Suchomel.

The Examiner pieces together portions of Call, Gunn, Perry and Suchomel to reject claims 17-19 and 26-28. The Examiner relies on "design choice" as the motivation for the combination. Mere assertions that it is well within the ordinary skill of the art or an obvious matter of design choice are insufficient to make out a prima facie case of obviousness. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1301 (BPAI 1993). Therefore, claims 17-19 are patentable for this additional reason.

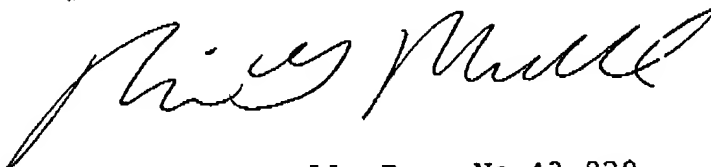


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For the reasons stated above, appellant respectfully requests the Office's rejections be reversed and claims 11 and 13-30 be allowed.

The Commissioner is hereby authorized to charge the fee for the appeal brief in the amount of \$250.00 to Deposit Account No. 19-1345. The Commissioner is hereby authorized to charge any additional fees which may be required to Deposit Account No. 19-1345.

Respectfully submitted,



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### CLAIMS APPENDIX

Claims 1-10. (Cancelled)

11. (Previously presented) A device for thermal sterilization of liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,

the heating section and the cooling section being spirally arranged around the heating source,

the heating source being generally located in the center of the spiral,

said conduit being constructed of flexible material,

individual windings of conduit lying one on the other and contacting each other, and

a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

12. (Cancelled)

13. (Previously presented) A device as set forth in claim 11 wherein the check valve is arranged on the heating section.

14. (Previously presented) A device as set forth in claim 13 wherein the check valve is arranged at the inlet end of the heating section.

15. (Original) A device as set forth in claim 11 wherein the conduit comprises two elastic films welded to one another at their lengthwise edges.

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16. (Previously presented) A device as set forth in claim 11 wherein the conduit comprises first, second and third elastic films welded to one another at their lengthwise edges and wherein the first and second films are separated from each other by the third film.

17. (Original) A device as set forth in claim 11 wherein the conduit comprises two tubular individual conduits arranged one inside the other.

18. (Original) A device as set forth in claim 11 wherein the individual windings of conduit lie in the same plane.

19. (Original) A device as set forth in claims 11 wherein the individual windings of the conduit are arranged in a spherical form.

20. (Original) A device as set forth in claim 11 wherein the conduit is made of a metal film.

21. (Original) A device as set forth in claim 11 wherein the conduit is made of a plastic film.

22. (Previously presented) A thermal sterilizer for liquids comprising:

a counterflow heat exchanger including a conduit with a heating section and a cooling section in fluid connection with one another,

a heating source for heating the liquid,

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the heating section and the cooling section being spirally arranged around the heating source, said conduit being constructed of flexible material.

23. (Previously presented) A thermal sterilizer as set forth in claim 22 further comprising a check valve for allowing liquid flow only in a direction from the heating section to the cooling section.

24. (Previously presented) A thermal sterilizer as set forth in claim 22 wherein the conduit comprises two elastic films welded to one another at their lengthwise edges.

25. (Previously presented) A thermal sterilizer device as set forth in claim 11 wherein the conduit comprises first, second and third elastic films welded to one another at their lengthwise edges and wherein the first and second films are separated from each other by the third film.

26. (Previously presented) A thermal sterilizer as set forth in claim 22 wherein the conduit comprises two tubular individual conduits arranged coaxially one inside the other.

27. (Previously presented) A thermal sterilizer as set forth in claim 22 wherein the individual windings of conduit lie in the same plane.

28. (Previously presented) A thermal sterilizer as set forth in claims 22 wherein the individual windings of the conduit are arranged in a spherical form.

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29. (Previously presented) A thermal sterilizer as set forth in claim 22 wherein the conduit is made of a metal film.

30. (Previously presented) A thermal sterilizer as set forth in claim 22 wherein the conduit is made of a plastic film.

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**EVIDENCE APPENDIX**

None.

**RELATED PROCEEDINGS APPENDIX**

None.